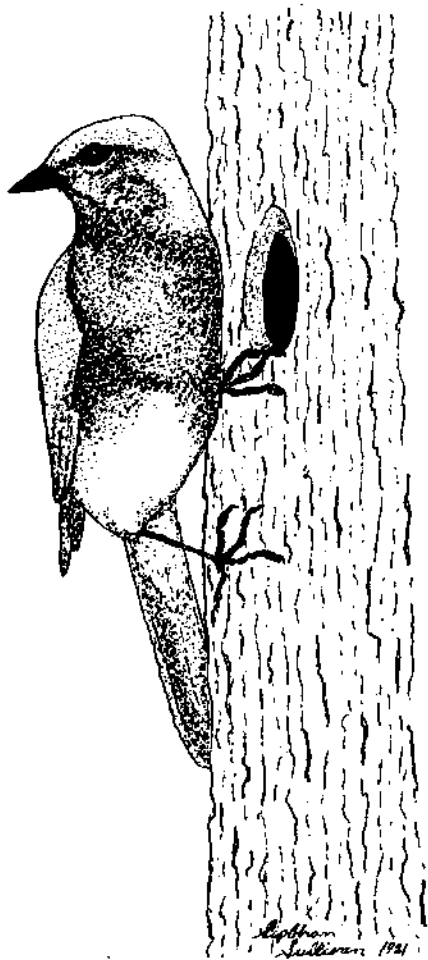


# **\*\*ATTENTION\*\***

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# **BLUEBIRD CONSERVATION IN WASHINGTON**



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## INTRODUCTION

Exact population figures are lacking, but a general decline in bluebird numbers has been very noticeable. This is puzzling since bluebirds are not conspicuously more subject to disease and predation than other species, and they appear to have reproductive capacity equal or superior to that of other cavity-nesting birds. Providing suitable nest boxes has had encouraging results; bluebird populations are stabilizing or even increasing in some areas. This paper examines some possible reasons behind declining numbers of bluebirds and some of the ways in which bluebird nest boxes may arrest or reverse this trend.

## ACKNOWLEDGEMENTS

We have relied heavily on the experience of persons interested or actively engaged in providing nesting facilities for bluebirds. All have been generous in sharing their knowledge. We would like to thank the following: Jack Adkins, Nongame Biologist, Dept. of Game, Region 1; Dan Beighle, North Cascades Audubon Society, Bellingham; Jess and Elva Brinkerhoff, Richland; Jack Davis, Black Hills Audubon Society, Olympia; Bob Everitt, Nongame Biologist, Dept. of Game, Region 5; David E. Goeke, Refuge Manager, Columbia National Wildlife Refuge; Eugene Hunn, Yakima County; Mrs. Don McCombs, Kooskia, Idaho; Trevor Moore, Roy; David Plemons, Spokane Audubon Society; Eleanor A. Pruett, Canyon Birders, Clarkston, Washington and Lewiston, Idaho; Dr. Tom Rogers, Spokane Audubon Society; Leonard Steiner, East Lake Washington Audubon Society, Kirkland; Raymond W. Scharpf, Packwood Ranger District, Gifford Pinchot National Forest; Paula Thrush, Rainier Audubon Society; and Donald N. White, Refuge Manager, Turnbull National Wildlife Refuge. If we have failed to mention anyone of the many who have been so helpful, we apologize for the omission.

## BLUEBIRD BIOLOGY

Washington has two species of bluebirds, the Western Bluebird, *Sialia mexicana*, and the Mountain Bluebird, *Sialia currucoides*. The Mountain Bluebird inhabits higher altitudes than the Western Bluebird, particularly during the breeding season. Where the ranges of the two species overlap, both may inhabit the same area with apparently little conflict.

Washington's two species of bluebirds have similar habitat requirements. Both are cavity nesters and utilize open country for foraging, capturing insects in flight or from the ground. Their winter diet is mainly small fruits of no commercial importance. Both species are considered migratory, but in Washington a few individuals are residents.

Optimal habitat for bluebirds contains scattered snags with nesting cavities. Sparse tree and shrub cover protects emerging fledglings. This habitat is often an early successional stage in a forested area or maintained by agricultural practices. Forest clearing and natural or artificially caused forest fires may have created an unusual abundance of bluebirds in the past. Therefore, apparent declines in bluebird numbers may constitute a return to a previous population density.

On the other hand, humans have altered "normal" conditions by introducing the starling and house sparrow, eliminating snags, and rapidly replanting forest openings. Therefore, providing nest boxes for bluebirds and other cavity nesting species is a worthwhile activity, as it compensates for some habitat loss.

Snags suitable for nesting must be identified and preserved in addition to providing artificial nest facilities. Nearly all cavity nesting species, including bluebirds, are to some extent dependent upon woodpeckers which create necessary cavities. Snags require little investment in maintenance and present a less obvious target to predators and vandals than nest boxes.

Both species lay an average clutch of four to six eggs, and the female is persistent in laying again if the first clutch is lost. Bluebirds often raise more than one brood during a single breeding season. The female and her brood are subject to attrition from numerous causes. Nestlings are parasitized by blowfly larvae which can seriously weaken or even kill them in excessive infestations. Fledglings are vulnerable to a wide range of predators, including mammals, reptiles and other birds.

#### NEST BOX DESIGN AND LOCATION

Boxes intended for backyard use can be as fancy as one desires, but for large-scale programs, simpler designs are more practical. The box should be readily opened for inspection and cleaning. Design adaptability allowing secure mounting of the box on a variety of supports -- posts, pipes, building exteriors, or trees -- is another useful feature.

Deep boxes are harder for predators to reach into, and the birds can add new nest material on top of old for second and third broods. Here one balances design considerations against material costs. The necessary drainage holes can be easily made by cutting off the corners of the floor board. Perches are unnecessary.

Wood is a readily available material, easily worked, adaptable to a variety of designs, and an effective insulator against extremes of heat and cold. Wood should be at least 3/4 inch thick. No painting is needed if exterior grade plywood, redwood or cedar are used. Unpainted boxes are easier and cheaper to maintain, less attractive to thieves and less easily seen by vandals. Assemble with weather-resistant fasteners, such as galvanized nails or brass screws. There has been experimentation with six inch plastic pipe, and it may be worth trying if it is available inexpensively.

There has been debate over whether the commonly used 1-1/2 inch entrance hole is large enough for Washington species. In many areas, the 1-1/2 inch hole has been readily accepted by the birds. In Klickitat County, bluebirds prefer the 1-5/8 inch entrance. It is probably wise to use the smallest size entrance that the birds will accept. Box designs shown (Figures I - III) have all been successfully used by bluebirds in Washington.

The location of the nest box is more important than design details. Competition with other species can be minimized if certain nest sites are

avoided. Sites with a great deal of brush nearby may be subject to use by house wrens. Open water nearby increases the possibility of competition from tree swallows. Sites close to farm buildings or houses may attract house sparrows and starlings. Although the box is intended for bluebirds, other species may take advantage of the facility. Native species are protected and should not be harrassed. The best solution is to move the box to a better location before the next breeding season.

Areas, such as orchards, pastures, golf courses, cemeteries, power line rights-of-way, or any place where vegetation is kept low, are good possibilities. They should not be subjected to intense pesticide usage or heavy traffic.

Spacing recommendations vary from 300 to 660 feet. Close spacing means more boxes, giving the birds a wider choice. Wide spacing cuts down on possible territorial conflict. Required foraging territory size may vary with location, so it is difficult to make definite recommendations. Ideally, the entrance hole should face away from the afternoon sun and the prevailing winds, and toward some cover in which the emerging fledglings can hide. Such cover should be within 50 to 100 feet of the nest box.

Height of nest boxes above ground can vary considerably. The North American Bluebird Society gives a range of 3 to 5 feet, but states that they can be higher if necessary. The Brinkerhoff's post-mounted boxes range from 5 to 8 feet, while they place their tree-mounted boxes as high as possible without adverse effect. Thoren's boxes are 3 to 10 feet above the ground. Higher boxes are probably more secure and may more closely simulate a natural cavity. If mounted on pasture fences, boxes should be placed so animals cannot bump against them or use them for back-scratchers.

If nest boxes are designed to be easily cleaned without dismounting, they can be mounted much more securely. This is a worthwhile consideration where vandalism, thievery or weather are problems.

Monitoring nest box productivity will demonstrate if predator deterrent measures, such as pipe mounting, greasing the pipe, and sheet metal guards, are necessary. Such methods are costly in time and material. Sufficient box depth and height, so the occupants are out of reach from the entrance and less readily noticed from the ground, should be sufficient preventive measures.

#### COMPETITION AND PREDATION

Complete deterrence of predation will not be possible in any event. It is better in the long run to provide deep boxes, mount them high, and locate them in an area where climbing predators are not usually found. Such "natural" methods give the birds the benefits they derive from careful selection of nest sites and minimize any tendency to develop over-dependence on human intervention.

Potential predators include weasels, squirrels, hawks and owls, feral cats, and raccoons, corvids (crows, jays, magpies, and possibly ravens).

Fortunately, predation by snakes seems to be a rare occurrence in Washington, in comparison to some other states.

Considerable emphasis has been placed on competition as a factor in the decline of bluebird populations. Starlings and house sparrows are most often held responsible. It has been noted that the decline in numbers of bluebirds became noticeable before the advent of the starling in significant numbers. Correlation between sparrow and bluebird population figures is difficult to demonstrate. It is interesting that few other species which compete with starlings and sparrows for nest cavities have declined in the same proportions as bluebirds.

Starlings and sparrows are said to avoid boxes with a well-lighted interior. The North American Bluebird Society is experimenting with a box which admits light through a screened panel, to discourage sparrows. Jack Davis has had some apparent success in keeping starlings out of boxes meant for purple martins, by painting the interior white. This might also be tried with bluebird boxes.

The most common competitor is the tree swallow. Violet-green swallows have adjusted to urbanization and nest in more congested areas than do bluebirds; as a result, competition between these species is not as great. In the Yakima area, violet-green swallows often nest in cavities in rock cliffs and roof tiles. Both species of swallows can use the same size box and entrance hole as bluebirds.

House wrens and flickers are other competitors. The wren not only uses a box, but also fills those it does not use with twigs. It will also puncture the eggs of other species occasionally.

#### CURRENT NEST BOX PROGRAMS

##### Westside Programs

Thurston County does not contain much suitable habitat for bluebirds. Burns and clearcuts grow back to brush rapidly, and the process is accelerated by the planting of Douglas fir seedlings. Consequently, the habitat is soon poorly suited to the bluebird's method of foraging, and house wrens proliferate. Attempts by Tahoma Audubon Society and by Jack Davis of Black Hills Audubon Society, Olympia, to encourage bluebird nesting have been largely futile. Bluebirds have been seen in the open prairie country at Fort Lewis, Pierce County. Some success may be possible there.

Trevor Moore, near Roy, Pierce County, has been working with a small population of western bluebirds since 1965. There is severe competition for nesting sites with swallows, and some years no bluebirds have fledged. The maximum number of bluebirds seen at Moore's home is eighteen. This was in 1965 and may represent a concentration from several areas, just prior to migration. It is difficult to know how many young are fledged unless one happens to be present when they leave the nest, but Moore believes that five young birds were produced in 1980.

Dan Beighle has placed nest boxes since 1975 in areas above 4,000 feet in Mt. Baker National Forest above Glacier. (See Fig. III for box design.)

Beighle's 125 nest boxes were not successfully used until 1977. That year the boxes attracted three pairs of Mountain Bluebirds. One pair died of unknown causes, and the other two pairs fledged six or seven young. In 1978 four pairs produced eighteen young. In 1979 four pairs were successful in fledging thirteen or fourteen young, and in 1980 four pairs fledged eighteen young.

Chestnut-backed Chickadees, Tree Swallows, mice, and yellowjackets also used the boxes. Starlings and House Sparrows, however, are not a problem in the Mt. Baker area. An unknown predator raided a number of boxes, but the major limiting factor seems to be the weather. Early broods are often unsuccessful.

### Eastside Programs

William Thoren has erected boxes in Yakima Co. since 1972. He currently has about 80 boxes in the Wenas area, seven boxes two miles west of Naches and eight in the Ahtanum area. They are mostly on Boise-Cascade property and State Game Department land.

Thoren's results are summarized below:

<u>Year</u>	<u>Number of young fledged</u>
1972	30
1973	69
1974	63
1975	90
1976	100+ (estimate only)
1977	91 young (only checked 41 nests)
1978	150
1979	200
1980	245

He has added and/or replaced about ten boxes a year.

Six nest boxes out of eight in the Ahtanum vicinity are occupied by tree swallows. Flickers have occasionally destroyed boxes, and chipmunks were also cited as pests. Sparrows and Starlings are not a problem thus far.

The Brinkerhoffs in Klickitat County have what is in many ways a non-typical operation. Their boxes are different in design from most, with peaked roofs; they are painted, while most others are left to weather naturally; the hole is 1-5/8 inches rather than the usual 1-1/2 inch (Fig. II). They have erected about 500 boxes in an area of 150 square miles in the Bickleton area. They do not have precise figures on the number of young fledged. Their bird houses are so conspicuous and attractive that they are often stolen or vandalized. For the last six years they have put up 100 boxes a year as additions or replacements.

Brinkerhoffs have had amazing success. They report two and sometimes three broods per season and find females incubating in April, June, and

August. Evidently, the habitat around Bickleton is suitable for bluebirds and has remained stable, unlike the conditions prevailing in much of western Washington.

In Spokane County, Dave Plemons has found the most successful nest boxes were those which were placed on metal fence posts enclosing pasture, wheat, or fallow fields. As of June 19, 1981, seventy-five young western bluebirds have been fledged from 15 to 200 eggs. In addition to Bluebirds, Mountain Chickadees, House Wrens, Pygmy Nuthatches, and Swallows utilize his bird boxes. This year Sparrows nested in one of his boxes, the first year they have done so.

The following results are from an article by Plemons in the Pygmy Owl, newsletter of the Spokane Audubon Society:

	<u>1979</u>	<u>1980</u>
Boxes used by Western Bluebirds	37	43
Clutch attempts	58	73
Clutch attempts completely successful	13	9
Clutch attempts failed (no young fledged)	17	39
Eggs	292	336
Eggs/young unaccounted for	69	159
Dead young	41	30
Fledged young	167	107

#### Bluebird Data

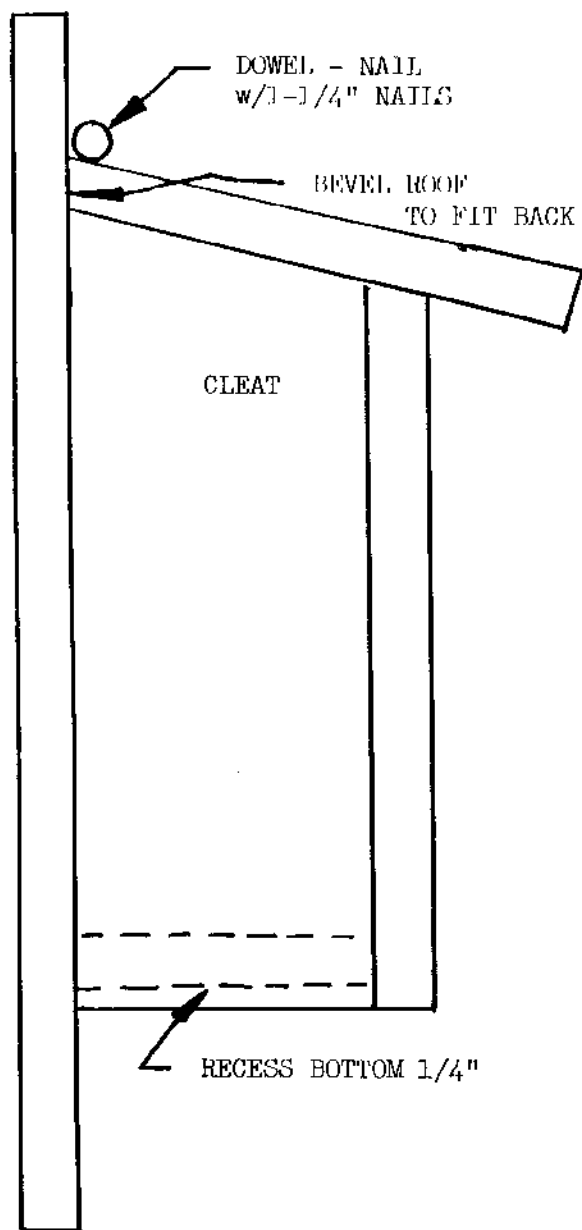
Observations of bluebirds and bluebird nests are collected and recorded in the Nongame Program's Data System. The tables contain a summary of the observations collected to date on bluebirds (Tables 1-4). It should be noted that areas having a large number of observers often report a disproportionately large number of birds. Any conclusions drawn must take into account this bias in the data. Hopefully, this summary will be an encouragement to data system contributors, especially at times and places where gaps exist in our information.

Most observations and breeding records are from eastern Washington (Tables 1-4). Breeding records tend to be concentrated in areas where there are active nest box projects. Some of this can be attributed to a greater number of interested observers, i.e., people who provide nest boxes; yet nest box projects certainly provide more cavities for bluebird nesting purposes. Breeding bluebird observations are of great interest to the Nongame Program's Data System. Observers are encouraged to share their information by sending their name, address, specific location of nest, and number of eggs or young (if known) to:

Nongame Wildlife Program  
c/o The Evergreen State College  
3109 Seminar Bldg., TA-00  
Olympia, WA 98505

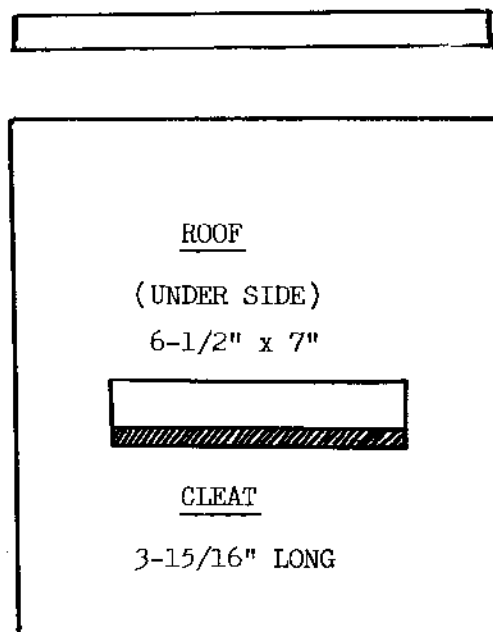


DOWEL 1/2" x 6-1/2"



ASSEMBLY - SIDE VIEW

NAIL WITH 1-3/4" NAILS



5/8"



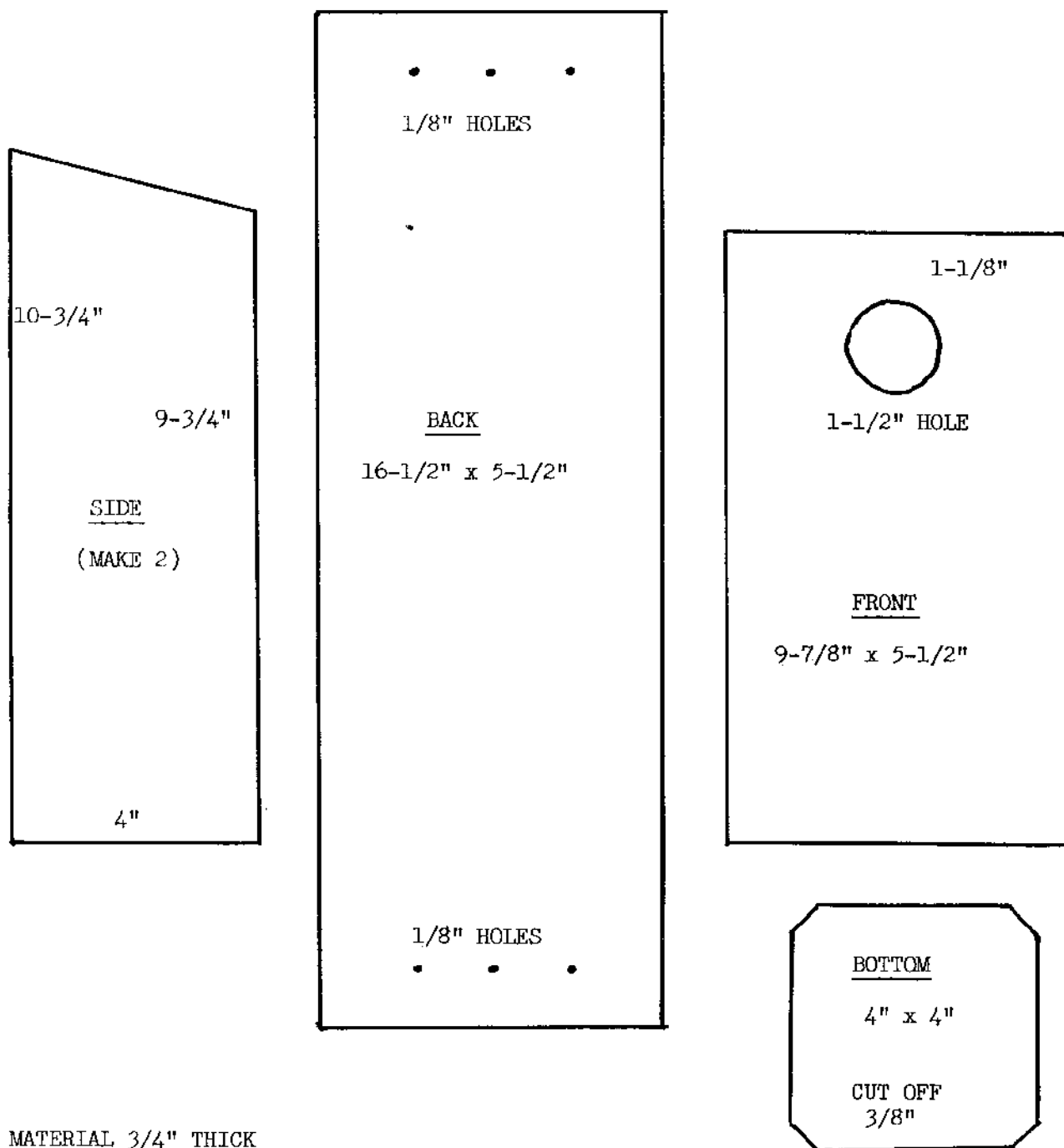
3/4" THICK

7/8"

CLEAT X-SECTION

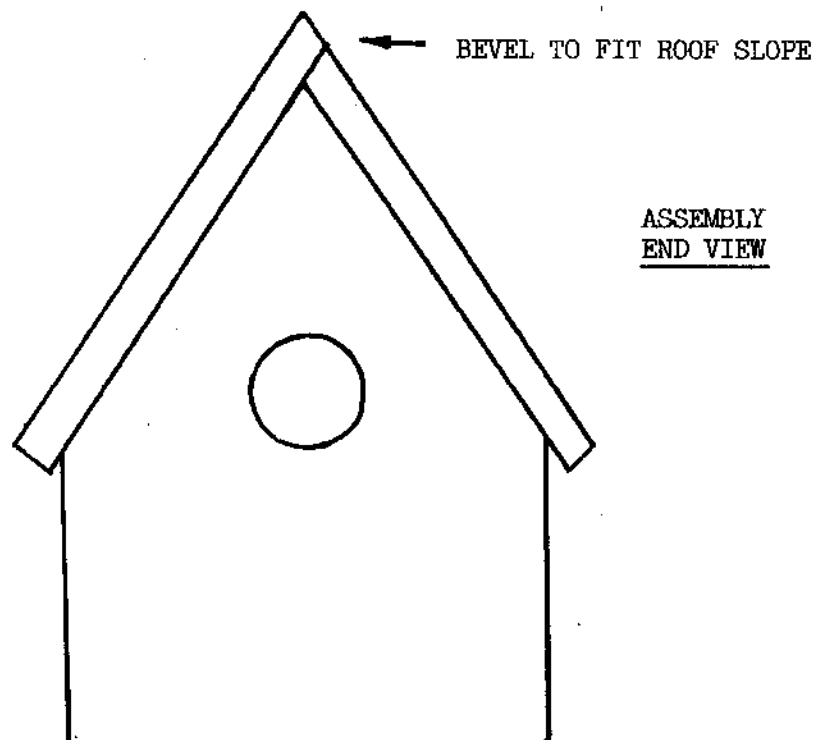
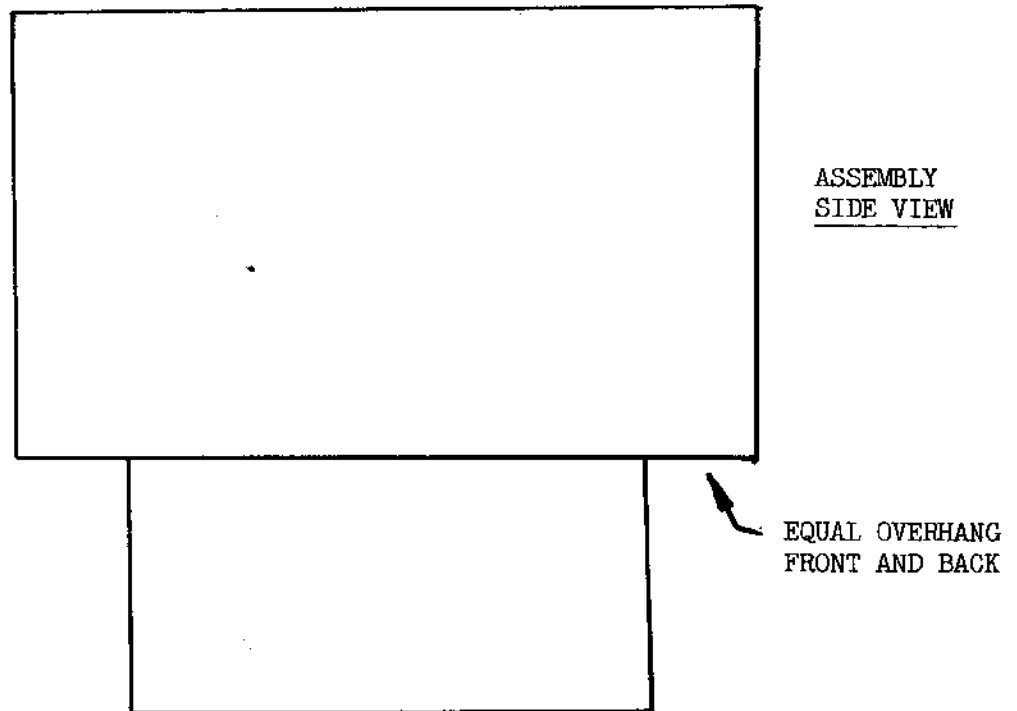
THE NORTH AMERICAN BLUEBIRD SOCIETY STANDARD BOX DESIGN

(Figure T)

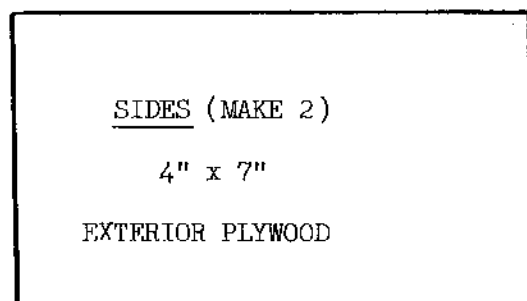
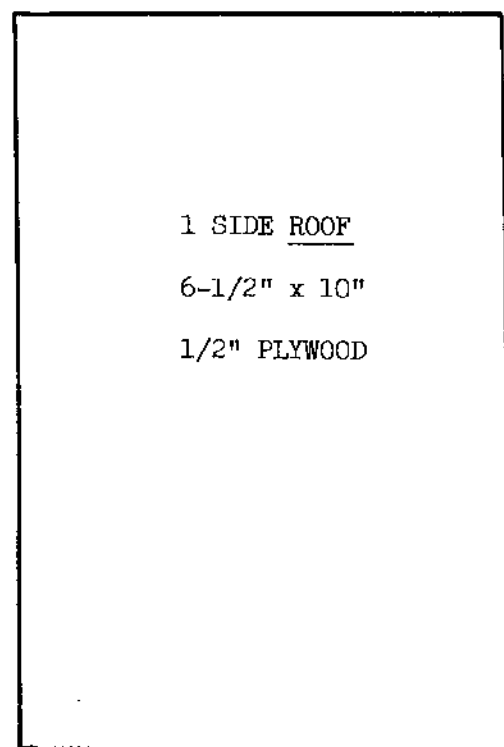
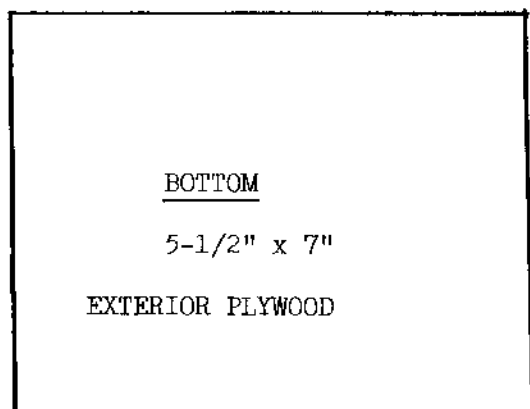
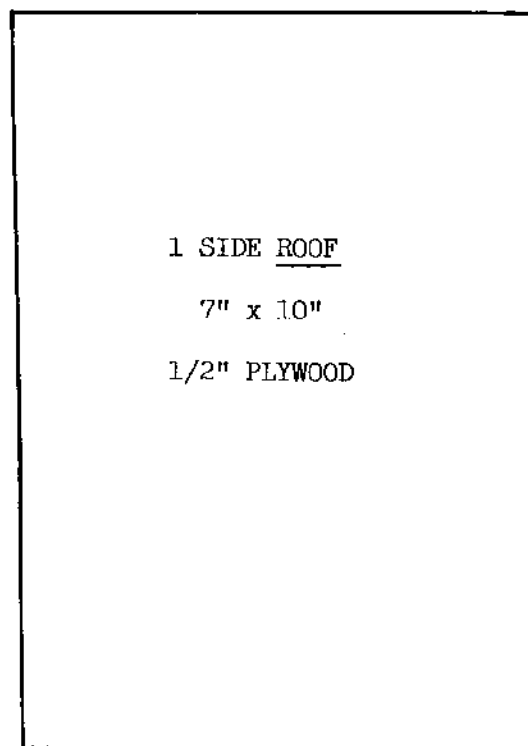
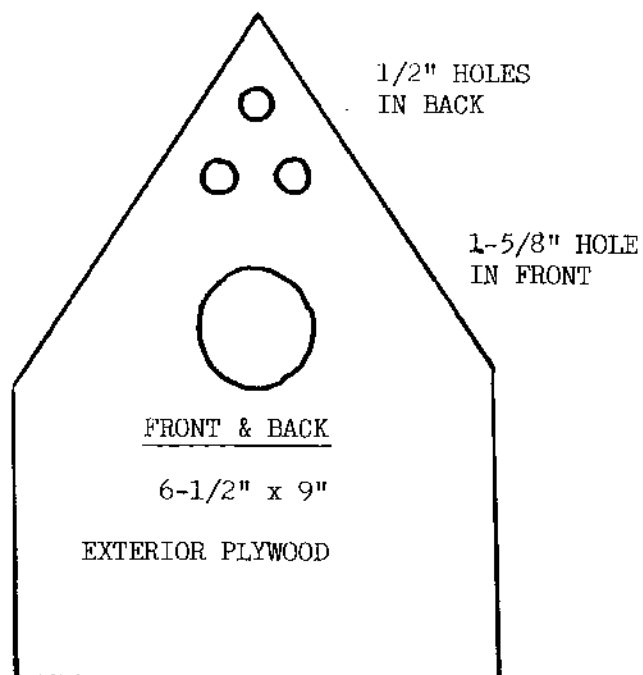


THE NORTH AMERICAN BLUEBIRD SOCIETY STANDARD BOX DESIGN

(Figure I)

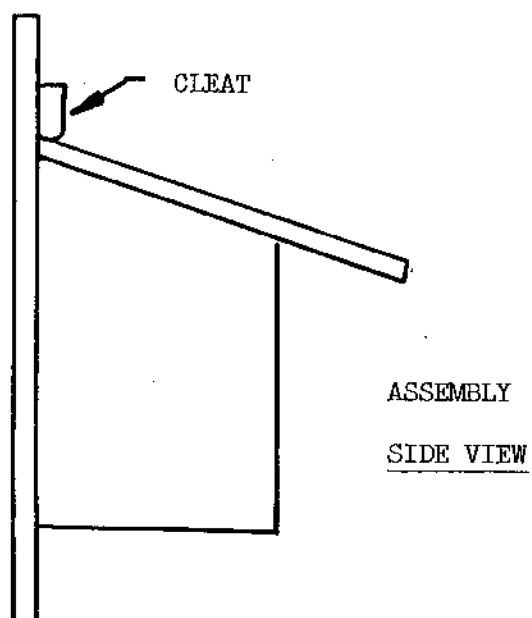
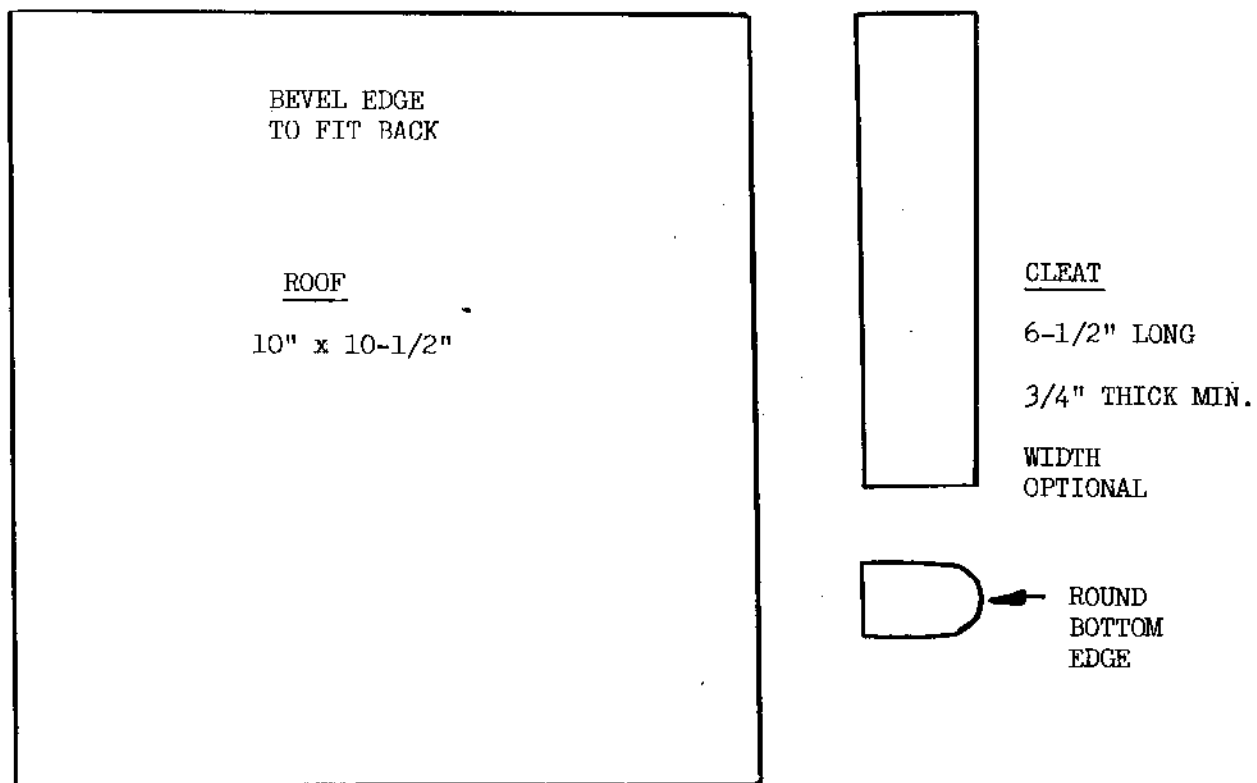


THE BRINKERHOFF BOX DESIGN  
(Figure II)



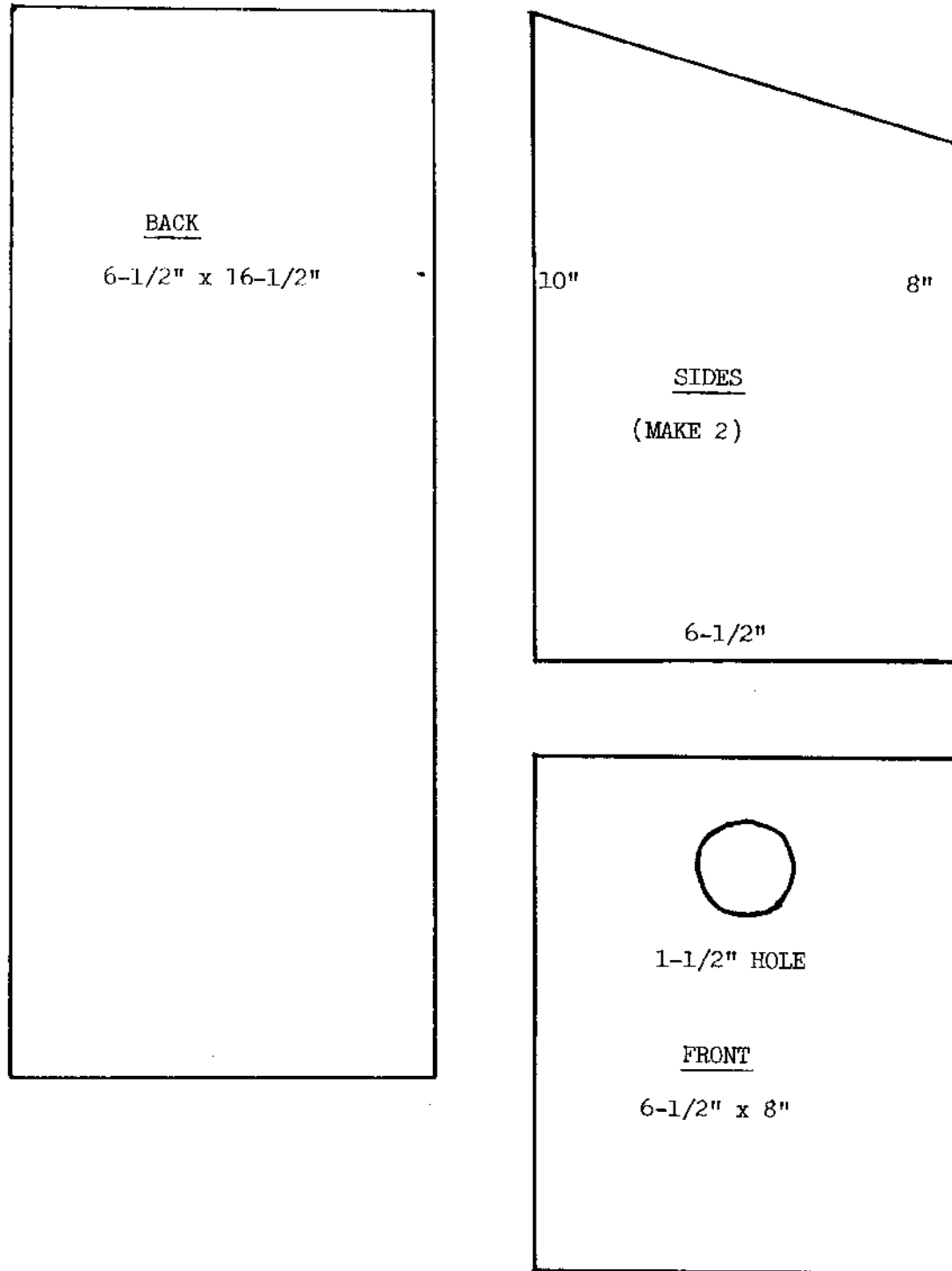
THE BRINKERHOFF BOX DESIGN

(Figure II)



THE BEIGHLE BOX DESIGN

(Figure III)



THE BEIGHLE BOX DESIGN

(Figure III)

TABLE 1. Number of observations and breeding occurrences (\*) in eastern Washington of mountain bluebirds, recorded in the Tongue Program Data Systems, by decade and county.

	ADAMS	ASOTIN	BENTON	CHELAM	COLUMBIA	DOUGLAS	FERRY	FRANKLIN	GARFIELD	GRANT	KITTITAS	Klickitat	LINCOLN	OKANOGAN	PEND OREILLE	SPOKANE	STEVENS	WALLA WALLA	WHITMAN	YAKIMA
1931 - 1940				1						3	3					1				
Winter																				
Spring																				
Summer											1					1				
Fall																				
1941 - 1950																				
Winter																				
Spring																				
Summer																				
Fall														1*					1	
1951 - 1960										1										
Winter																				
Spring											1			1		2,1*			1	
Summer											2*			3*		1*				
Fall													1			6	2			
1961 - 1970										1						8		1		1
Winter													3	1		12		1		6
Spring	4										1	2								
Summer	3						1,1*				1*			1		3,9*				
Fall	2												2		2	4	1			
1971 - 1980										1	2			5		2		1		3
Winter																				
Spring	18			5	1	3		6		8	17	9	20	55,1*	3,1*	5,1*	3	10	53,2*	
Summer	12			3	1		2			1	1	2	1	56,2*	1	3,3*	1	1	15,3*	
Fall	14			2	3		2		1		2		9	16	7		3	2		3

TABLE 2. Number of observations and breeding occurrences (\*) in western Washington of mountain bluebirds, recorded in the Nongame Program Data Systems, by decade and county.

		CLALLAM	CLARK	COMALTZ	GRAYS HARBOR	ISLAND	JEFFERSON	KING	KITSAP	LEWIS	MASON	PACIFIC	PIERCE	SAN JUAN	SKAGIT	SKAMANIA	SHROUOLISH	THURSTON	WAHLEAKUM	WHATCOM
1931 - 1940	Winter																			
	Spring																			
	Summer																			
	Fall							1												
1941 - 1950	Winter																			
	Spring																			
	Summer																			
	Fall																			
1951 - 1960	Winter																			
	Spring																			
	Summer																			
	Fall																			
1961 - 1970	Winter																			
	Spring																			
	Summer								1											
	Fall							1									1*			
1971 - 1980	Winter															1				2
	Spring				2			4		1	1	3						1		
	Summer									1		9								
	Fall															1				



TABLE 3. Number of observations and breeding occurrences (\*) in eastern Washington of western bluebirds, recorded in the Nongame Program Data System, by decade and county.

	ADAMS	ASHTON	BENTON	CHelan	COLUMBIA	DOUGLAS	FERRY	FRANKLIN	GARFIELD	GRANT	KITTITAS	KLICHTAT	LINCOLN	OKANOGAN	PEND OREILLE	SPOKANE	STEVENS	WALLA WALLA	WHITMAN	YAKIMA
1931 - 1940																1				
Winter																				
Spring										2	2									4
Summer																				
Fall																1				
1941 - 1950															1		1		3	
Winter																				
Spring																				
Summer															1					
Fall																				
1951 - 1960																3				
Winter																				
Spring																5			1	
Summer											1*				1	1*			1*	
Fall															1	12				
1961 - 1970																4				1
Winter			1	1							5	1			1	17,4*		1		4
Spring																				
Summer		1		2												8,4*				14,1*
Fall											1					10	2			
1971 - 1980						1										7		2		5
Winter																				
Spring		8	1	3		5		1		5		5	6	21		12,7*	2	4	6	35,1*
Summer		3		3,1*		1	1		3			7,1*	2	6,5*		6,10*	3*	1	1*	10,1*
Fall		3		4			1						4	4		5	4			6

TABLE 4. Number of observations and breeding occurrences (\*) in western Washington of western bluebirds, recorded in the Nongame Program Data Systems, by decade and county.

		CLALLAM	CLARK	COMLITZ	GRAYS HARBOR	ISLAND	JEFFERSON	KING	KITSAP	LEWIS	MASON	PACIFIC	PIERCE	SAN JUAN	SKAGIT	SKAMANIA	SNOHOMISH	THURSTON	WAHIAKUM	WHATCOM
1931 - 1940	Winter							1					1					2		
	Spring							6					3					2*		
	Summer							3										1, 1*		
	Fall							3						1				1		
1941 - 1950	Winter																			
	Spring												1*							
	Summer																			
	Fall																			
1951 - 1960	Winter																			
	Spring										1*									
	Summer																			
	Fall																			
1961 - 1970	Winter																			
	Spring																			
	Summer																			
	Fall																			
1971 - 1980	Winter		1							2			7					4		
	Spring					1						1, 13*						10, 4*		
	Summer							2			1*	3, 2*	1				1	4, 2*		3*
	Fall					1							1					2		1*